AS 1627.7—1988

Australian Standard®

Metal finishing—Preparation and pretreatment of surfaces

Part 7: Hand tool cleaning of metal surfaces

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Australasian Institute of Metal Finishing

Bureau of Steel Manufacturers of Australia

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Department of Defence

Metal Trades Industry Association of Australia

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Part 7: Hand tool cleaning of metal surfaces

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PREFACE

This Standard was prepared under the direction of the Association's Committee on Metal Finishing, to supersede AS 1627.7–1977, *Preparation and pretreatment of metal surfaces prior to protective coating – Hand cleaning of steel surfaces.*

This Standard is one in a series of Standards covering the preparation and pretreatment of metal surfaces used in metal finishing. Others in the series are as follows:

AS
1627.0 —*Method selection guide for preparation and pretreatment of steel surfaces*
1627.1 —*Degreasing of metal surfaces using solvent or alkaline solutions*
1627.2 —*Power tool cleaning of steel surfaces*
1627.3 —*Flame cleaning steel surfaces*
1627.4 —*Abrasive blast cleaning of steel surfaces*
1627.5 —*Pickling steel surfaces*
1627.6 —*Phosphate treatment of iron and steel surfaces*
1627.8 —*Wash primer pretreatment of metal surfaces*
1627.9 —*Pictorial surface preparation standards for painting steel surfaces.*
1627.10 —*Cleaning and preparation of metal surfaces using acid solutions (non immersion).*

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FOREWORD

Hand tool cleaning can be an acceptable method of surface preparation for mild interior and exterior atmospheric exposures, and for many maintenance situations where paints of good wettability are used. Hand tool cleaning is the least effective method of surface preparation for durability of paint coatings.

Hand tool cleaning is an expensive, limited cleaning method which is slow and physically arduous, and should only be considered when power tool or abrasive blast cleaning methods cannot be used. These methods are faster and more effective.

It will not remove all residues of rust or other corrosion products, nor will it remove firmly adherent millscale. For small limited areas, such as spot cleaning for maintenance priming, hand cleaning may suffice, even for paints requiring very clean surfaces.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METAL FINISHING—PREPARATION AND PRETREATMENT OF SURFACES

PART 7: HAND TOOL CLEANING OF METAL SURFACES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard describes procedures and equipment for the preparation, by hand tools, of metal surfaces to which protective coatings are to be subsequently applied, and specifies surface finish requirements.

NOTE: Appendix A contains advice and recommendations on information which should be supplied by the purchaser at the time of inquiry or order.

1.2 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

AS

1627 Code of practice for preparation and pretreatment of metal surfaces prior to protective coating
- Part 1: Degreasing of metal surfaces using solvent or alkaline solutions (AS 1627.1)
- Part 9: Pictorial surface preparation standards for painting steel surfaces (AS 1627.9)

1715 Selection use and maintenance of respiratory protective devices

1716 Respiratory protective devices

1.3 DEFINITIONS. For the purpose of this Standard, the definition below applies.

Hand tool cleaning—a method of preparing metal surfaces prior to painting, by removing loose mill scale, rust or other corrosion products and paint, by means of hand wire brushing, hand sanding, hand scraping, hand chipping (see Foreword) or a combination of these methods.

1.4 SURFACE REQUIREMENTS.

1.4.1 Steel. Surfaces shall be prepared to comply with one of the following classes, as specified:

(a) Class 1— all loose material removed.

(b) Class 2— all loose material removed, plus some polishing or scratching to bare metal, producing at least an equivalent to St 2; some areas may be equivalent to St 3. (See AS 1627.9.)

1.4.2 Metals other than steel. Surface preparation is to be specified.

NOTE: Guidance on surface preparation of light metals is given in Table 2.2.

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SECTION 2. METHODS OF OPERATION

2.1 EQUIPMENT. Hand cleaning tools consist of chipping hammers, hand scrapers, wire brushes, and surface coated abrasives. Specially shaped scrapers are sometimes necessary. Tungsten carbide-tipped scrapers are recommended for use on steel surfaces only. Chipping hammers should not be used on light metal surfaces.

Steel bristles of wire brushes shall have sufficient rigidity to clean the surface, and shall be kept free of excess foreign matter, and be discarded when no longer effective. Hand scrapers shall be kept sharp enough to be effective.

Abrasive cloth or paper should be of a grade suitable for the intended cleaning. Too fine may give little cleaning and too coarse may cause scratches, especially on non-ferrous metal if used dry. 'Wet and dry' paper, used wet with water, will increase the speed and cleaning efficiency–the surface should be dried with clean cloths and not left to dry.

2.2 PRELIMINARY CLEANING AND DESCALING. Oil, grease and other similar foreign matter, and soluble fluxes and fume deposits from areas adjacent to recent weld runs, shall be removed by solvent cleaning (see AS 1627.1) or by fresh water washing, as appropriate.

Heavy rust scale, when present, shall be loosened by hand hammering, chipping or scraping or by a combination of these.

Chipping and scraping are usually carried out prior to any wire brushing of steel surfaces. Chipping is not recommended for soft metal surfaces. If scraping is used gouging of the surface metal shall be avoided.

2.3 HAND TOOL CLEANING. Loose millscale, and loose or non-adherent rust (on steel) and corrosion products on light metals shall be removed by hand wire brushing, hand sanding, hand scraping or by a combination of these methods, to produce the required standard of surface preparation described in Tables 2.1 and 2.2.

On previously painted surfaces, loose or non-adherent paint shall be removed by scraping. Thick edges of remaining old paint shall be feathered by hand sanding so that the repainted surface will have a smooth appearance. The remaining old paint shall be examined for adhesion by probing with the blade of a putty knife.

The accessible portions of partially enclosed structural members shall be cleaned. On new work, areas which are inaccessible after assembly shall be cleaned and coated before assembly.

Special attention shall be given to rivet heads, cracks, crevices, lap joints, fillet welds and re-entrant angles using a combination of tools as required.

Hand tools should be used in such a way that no burrs or sharp edges are left on the surface, and no sharp cuts are made in the metal surface. If such defects occur, they shall be removed by hand sanding. On steel surfaces, tungsten carbide-tipped scrapers may be used.

2.4 FINAL CLEANING. All residual dust and loose material shall be removed from the surface, using vacuum, dry compressed air or a clean brush. All oil, grease, etc, left on the surface shall be removed by swabbing with an appropriate solvent (see AS 1627.1) or other appropriate cleaning agent. Any residues such as salts or acids left on the surface shall be thoroughly washed off with fresh water and the surface shall be dried immediately.

2.5 APPLICATION OF COATING. The appropriate protective coating shall be applied not later than the same day on which the cleaning is undertaken, and shall be applied as soon as possible after cleaning has taken place and before visible deterioration of the surface has occurred.

2.6 SAFETY PRECAUTIONS.

2.6.1 General. The contractor shall ascertain, comply with and observe all the statutes, regulations, and instructions of the relevant statutory authorities.

2.6.2 Health hazards. Health hazards associated with hand tool cleaning include the following:

(a) Particles of metal which could penetrate the eye.

(b) Fire or explosion.

2.6.3 Eye protection. Safety goggles shall be worn by operators (see AS 1715 and AS 1716).

2.6.4 Safe working guidelines. Where chipping hammers are used near flammable material or fumes, non-sparking tools should be used.

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TABLE 2.1

GUIDE TO SURFACE PREPARATION OF STEEL ACHIEVABLE WITH HAND TOOLS

Original surface condition	Chipping hammer	Scraper	Hand held wire brush	Abrasive cloth or paper
A. Unpainted. Intact mill scale over the whole surface. Typified by Rust Grade A of AS 1627.9.	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B. Unpainted. Surface with some rust partly flaked. Typified by Rust Grade B of AS 1627.9.	Will remove loosely adherent millscale only. Continuous hammering causes scarring of the metal and provides fissures for secondary corrosion.	Will remove loosely adherent millscale only.	Will remove loosely adherent millscale and powdery rust only.	Very coarse abrasive cloth will remove only loosely adherent millscale and powdery rust.
C. Unpainted. Surface is considerably rusted and lightly pitted. No intact millscale remains. Typified by Rust Grade C of AS 1627.9.	Will remove rust only partially. Rust retained in pits. Continuous hammering causes scarring of the metal and provides fissures for secondary corrosion.	Not applicable.	Will remove rust only partially. Rust retained in pits.	Will remove rust only partially. Rust retained in pits.
D. Unpainted. Surface is heavily rusted and pitted. Varying amounts of rust scale may be present. No intact millscale remains.	Will break adhesion of rust flakes and heavy rust.	Will remove loosened rust only.	Will only remove loosely adherent and powdery rust.	Will remove loosely adherent and powdery rust only.
E. Previously painted. Little or no rust evident. Paint coating with only minor defects.	Not applicable.	Will remove any loosely adherent coatings.	Will remove any loosely adherent coatings.	Suitable.
F. Previously painted. Varying amounts of visible rust. Paint coating with blistering, flaking or other defects.	Only paint and some loosely adhering rust removed. Continuous hammering will cause scarring.	Will remove loosely adherent paint and rust only.	Will remove loosely adherent paint and rust only.	Vigorous rubbing is required to remove rust and defective paint.

TABLE 2.2

GUIDE TO SURFACE PREPARATION OF LIGHT METALS ACHIEVABLE WITH HAND TOOLS

Hand tool	Suitability — Original surface condition: Condition A*	Suitability — Original surface condition: Condition B†	Remarks
Scraper	Will remove any loosely adherent coatings.	Will remove any loosely adherent paint and rust only.	—
Wire brush	Will remove any loosely adherent coatings.	Will remove loosely adherent paint and rust only.	Steel wire brushes are not recommended because their use may result in steel particles remaining on the surface which may initiate bimetallic corrosion. If used, particles must be removed on completion or wire brushing.
Abrasive cloth or paper	Suitable	Coarse grade abrasive cloth will remove old paint and corrosion products from the plane surface. Will not remove corrosion from pits.	—

* Previously painted; little or no corrosion evident; paint coating having only minor defects.
† Previously painted; varying amounts of visible corrosion present; paint coating having blistering, flaking or other defects; in many cases a combination of all three tools may be required.

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APPENDIX A

PURCHASING GUIDELINES

(This Appendix does not form an integral part of this Standard)

A1 GENERAL. Australian Standards are intended to include the technical provisions necessary for the supply of products referred to in the particular Standard, but do not purport to comprise all the necessary provisions of a contract. This Appendix contains advice, and recommendations on the information to be supplied by the purchaser at the time of inquiry or order.

Its aims are to avoid misunderstanding, and to result in the purchaser receiving satisfactory products and service.

A2 INFORMATION TO BE SUPPLIED BY THE PURCHASER. The purchaser should supply the following information at the time of enquiry or order:

(a) The original surface condition.

(b) Method to be used.

(c) Class of cleaning required.

(d) Treatments required for welds and steel defects.

(e) Requirements for preliminary cleaning.

(f) Maximum delay allowed before coating application.

(g) Nature of the coating.

(h) Quality control and inspection requirements.

(j) Special requirements for particular site and weather.

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